

IEER INTEGRATED ENERGY EFFICIENCY RATIO

Part load performance of commercial HVAC systems was represented as Integrated Part Load Performance (IPLV) which was used until January 1, 2010. Then a new methodology was adopted and defined as Integrated Energy Efficiency Ratio (IEER).

IEER is intended to be used as a representation of part load performance for energy comparisons of similar systems. For Variable Refrigerant Flow (VRF) Multi Split systems AHRI Standard 1230 defines the process to calculate IEER. In a most simplistic form IEER is calculated by operating the system at 4 different capacities and applying a formula. The basic calculation is as follows:

$$\text{IEER} = (0.02 * A) + (0.617 * B) + (0.238 * C) + (0.125 * D)$$

Where as:

A = EER at 100% net capacity at AHRI standard condition (95 deg F)
 B = EER at 75% net capacity and reduced ambient (81.5 deg F)
 C = EER at 50% net capacity and reduced ambient (68 deg F)
 D = EER at 25% net capacity and reduced ambient (65 deg F)

Example:

$$\begin{aligned} A &= 11.0 \text{ EER} \quad B = 16.0 \text{ EER} \quad C = 19.0 \text{ EER} \quad D = 23.0 \text{ EER} \\ \text{IEER} &= (0.02 * 11) + (0.617 * 16) + (0.238 * 19) + (0.125 * 23) \\ \text{IEER} &= 0.2 + 9.8 + 4.5 + 2.9 = 17.4 \text{ IEER} \end{aligned}$$

Some points to recognize from this calculation:

1. Full load EER (100% capacity) represents only 2% of the overall IEER rating because the system would rarely operate at this condition.
2. As overall capacity is reduced the system EER increases significantly.
3. An ECOi system operating at 50% part load could result in an efficiency increase of more than 70% over the rated full load EER value.
4. Your actual efficiency could exceed the IEER rating depending upon equipment sizing, environment and use of the system.

ECOi™ System Certified Efficiency Ratings

Rating Standard: AHRI 1230				COOLING PERFORMANCE			HEATING PERFORMANCE				SIMULTANEOUS OPERATION PERFORMANCE
Type		System Model Number	Indoor Unit Rating Type	Capacity (Btuh)	EER	IEER	High Heating 47F Capacity (Btuh)	COP	Low Heating 17F Capacity (Btuh)	COP	Simultaneous Cooling-Heating Efficiency (SCHE)
Heat Pump	Normal	U-72ME1U9	Ducted	72,000	11.5	16.7	81,000	3.53	47,000	2.31	
Heat Pump	Normal	U-72ME1U9	Mixed	70,500	11.3	17.1	79,000	3.42	44,500	2.28	
Heat Pump	Normal	U-72ME1U9	Non-Ducted	69,500	11	17.4	77,500	3.31	42,000	2.25	
Heat Pump	Salt Protect	U-72ME1U9E	Ducted	72,000	11.5	16.7	81,000	3.53	47,000	2.31	
Heat Pump	Salt Protect	U-72ME1U9E	Mixed	70,500	11.3	17.1	79,000	3.42	44,500	2.28	
Heat Pump	Salt Protect	U-72ME1U9E	Non-Ducted	69,500	11	17.4	77,500	3.31	42,000	2.25	
Heat Pump	Normal	U-96ME1U9	Ducted	95,000	11.1	16.3	106,500	3.32	69,000	2.26	
Heat Pump	Normal	U-96ME1U9	Mixed	94,000	11.1	16.7	104,500	3.32	63,500	2.26	
Heat Pump	Normal	U-96ME1U9	Non-Ducted	93,000	11	17	103,000	3.31	58,500	2.25	
Heat Pump	Salt Protect	U-96ME1U9E	Ducted	95,000	11.1	16.3	106,500	3.32	69,000	2.26	
Heat Pump	Salt Protect	U-96ME1U9E	Mixed	94,000	11.1	16.7	104,500	3.32	63,500	2.26	
Heat Pump	Salt Protect	U-96ME1U9E	Non-Ducted	93,000	11	17	103,000	3.31	58,500	2.25	
Heat Pump	Normal	WU-144ME1U9	Ducted	139,000	10.9	16.7	157,000	3.24	93,500	2.05	
Heat Pump	Normal	WU-144ME1U9	Mixed	138,000	11	17.1	154,000	3.28	88,500	2.15	
Heat Pump	Normal	WU-144ME1U9	Non-Ducted	137,000	11	17.4	151,000	3.31	83,500	2.25	
Heat Pump	Salt Protect	WU-144ME1U9E	Ducted	139,000	10.9	16.7	157,000	3.24	93,500	2.05	
Heat Pump	Salt Protect	WU-144ME1U9E	Mixed	138,000	11	17.1	154,000	3.28	88,500	2.15	
Heat Pump	Salt Protect	WU-144ME1U9E	Non-Ducted	137,000	11	17.4	151,000	3.31	83,500	2.25	
Heat Pump	Normal	WU-168ME1U9	Ducted	164,000	10.8	16.4	184,000	3.22	114,000	2.05	
Heat Pump	Normal	WU-168ME1U9	Mixed	162,000	10.7	16.8	181,000	3.22	106,000	2.05	
Heat Pump	Normal	WU-168ME1U9	Non-Ducted	160,000	10.6	17.2	178,500	3.21	98,000	2.05	
Heat Pump	Salt Protect	WU-168ME1U9E	Ducted	164,000	10.8	16.4	184,000	3.22	114,000	2.05	
Heat Pump	Salt Protect	WU-168ME1U9E	Mixed	162,000	10.7	16.8	181,000	3.22	106,000	2.05	
Heat Pump	Salt Protect	WU-168ME1U9E	Non-Ducted	160,000	10.6	17.2	178,500	3.21	98,000	2.05	
Heat Pump	Normal	WU-192ME1U9	Ducted	192,000	10.7	16.3	213,000	3.22	132,000	2.05	
Heat Pump	Normal	WU-192ME1U9	Mixed	189,000	10.7	16.7	209,500	3.22	123,000	2.05	
Heat Pump	Normal	WU-192ME1U9	Non-Ducted	186,000	10.6	17	206,000	3.21	114,000	2.05	
Heat Pump	Salt Protect	WU-192ME1U9E	Ducted	192,000	10.7	16.3	213,000	3.22	132,000	2.05	
Heat Pump	Salt Protect	WU-192ME1U9E	Mixed	189,000	10.7	16.7	209,500	3.22	123,000	2.05	
Heat Pump	Salt Protect	WU-192ME1U9E	Non-Ducted	186,000	10.6	17	206,000	3.21	114,000	2.05	
Heat Pump	Normal	WU-216ME1U9	Ducted	203,000	10.7	16.3	228,000	3.22	136,000	2.05	
Heat Pump	Normal	WU-216ME1U9	Mixed	200,500	10.7	16.6	224,500	3.22	128,000	2.05	
Heat Pump	Normal	WU-216ME1U9	Non-Ducted	198,000	10.6	16.9	221,000	3.21	120,000	2.05	
Heat Pump	Salt Protect	WU-216ME1U9E	Ducted	203,000	10.7	16.3	228,000	3.22	136,000	2.05	
Heat Pump	Salt Protect	WU-216ME1U9E	Mixed	200,500	10.7	16.6	224,500	3.22	128,000	2.05	
Heat Pump	Salt Protect	WU-216ME1U9E	Non-Ducted	198,000	10.6	16.9	221,000	3.21	120,000	2.05	
Heat Pump	Normal	WU-240ME1U9	Ducted	230,000	10.6	16.3	265,000	3.22	159,000	2.05	
Heat Pump	Normal	WU-240ME1U9	Mixed	225,500	10.6	16.5	255,500	3.22	147,500	2.05	
Heat Pump	Normal	WU-240ME1U9	Non-Ducted	221,000	10.6	16.7	246,000	3.21	136,000	2.05	

Rating Standard: AHRI 1230				COOLING PERFORMANCE			HEATING PERFORMANCE				SIMULTANEOUS OPERATION PERFORMANCE
Type		System Model Number	Indoor Unit Rating Type	Capacity (Btuh)	EER	IEER	High Heating 47F		Low Heating 17F		Simultaneous Cooling-Heating Efficiency (SCHE)
							Capacity (Btuh)	COP	Capacity (Btuh)	COP	
Heat Pump	Salt Protect	WU-240ME1U9E	Ducted	230,000	10.6	16.3	265,000	3.22	159,000	2.05	
Heat Pump	Salt Protect	WU-240ME1U9E	Mixed	225,500	10.6	16.5	255,500	3.22	147,500	2.05	
Heat Pump	Salt Protect	WU-240ME1U9E	Non-Ducted	221,000	10.6	16.7	246,000	3.21	136,000	2.05	
Heat Pump	Normal	WU-264ME1U9	Ducted	258,000	9.8	16.2	288,000	3.22	177,000	2.05	
Heat Pump	Normal	WU-264ME1U9	Mixed	255,000	9.7	16.4	278,500	3.22	163,500	2.05	
Heat Pump	Normal	WU-264ME1U9	Non-Ducted	252,000	9.5	16.6	269,000	3.21	150,000	2.05	
Heat Pump	Salt Protect	WU-264ME1U9E	Ducted	258,000	9.8	16.2	288,000	3.22	177,000	2.05	
Heat Pump	Salt Protect	WU-264ME1U9E	Mixed	255,000	9.7	16.4	278,500	3.22	163,500	2.05	
Heat Pump	Salt Protect	WU-264ME1U9E	Non-Ducted	252,000	9.5	16.6	269,000	3.21	150,000	2.05	
Heat Pump	Normal	WU-288ME1U9	Ducted	281,000	9.7	16.1	312,000	3.22	194,000	2.05	
Heat Pump	Normal	WU-288ME1U9	Mixed	278,000	9.6	16.3	302,500	3.22	179,500	2.05	
Heat Pump	Normal	WU-288ME1U9	Non-Ducted	275,000	9.5	16.5	293,000	3.21	165,000	2.05	
Heat Pump	Salt Protect	WU-288ME1U9E	Ducted	281,000	9.7	16.1	312,000	3.22	194,000	2.05	
Heat Pump	Salt Protect	WU-288ME1U9E	Mixed	278,000	9.6	16.3	302,500	3.22	179,500	2.05	
Heat Pump	Salt Protect	WU-288ME1U9E	Non-Ducted	275,000	9.5	16.5	293,000	3.21	165,000	2.05	
Heat Recovery	Normal	U-72MF1U9	Ducted	72,000	11.4	16.4	81,000	3.5	47,000	2.28	24.0
Heat Recovery	Normal	U-72MF1U9	Mixed	70,500	11.2	16.8	79,000	3.41	44,500	2.27	24.4
Heat Recovery	Normal	U-72MF1U9	Non-Ducted	69,500	10.9	17.1	77,500	3.31	42,000	2.25	24.7
Heat Recovery	Salt Protect	U-72MF1U9E	Ducted	72,000	11.4	16.4	81,000	3.5	47,000	2.28	24.0
Heat Recovery	Salt Protect	U-72MF1U9E	Mixed	70,500	11.2	16.8	79,000	3.41	44,500	2.27	24.4
Heat Recovery	Salt Protect	U-72MF1U9E	Non-Ducted	69,500	10.9	17.1	77,500	3.31	42,000	2.25	24.7
Heat Recovery	Normal	U-96MF1U9	Ducted	95,000	11	16	106,500	3.3	69,000	2.25	23.1
Heat Recovery	Normal	U-96MF1U9	Mixed	94,000	11	16.4	104,500	3.31	63,500	2.25	23.3
Heat Recovery	Normal	U-96MF1U9	Non-Ducted	93,000	10.9	16.7	103,000	3.31	58,500	2.25	23.5
Heat Recovery	Salt Protect	U-96MF1U9E	Ducted	95,000	11	16	106,500	3.3	69,000	2.25	23.1
Heat Recovery	Salt Protect	U-96MF1U9E	Mixed	94,000	11	16.4	104,500	3.31	63,500	2.25	23.3
Heat Recovery	Salt Protect	U-96MF1U9E	Non-Ducted	93,000	10.9	16.7	103,000	3.31	58,500	2.25	23.5
Heat Recovery	Normal	WU-144MF1U9	Ducted	139,000	10.8	16.4	157,000	3.21	93,500	2.05	23.1
Heat Recovery	Normal	WU-144MF1U9	Mixed	138,000	10.9	16.8	154,000	3.26	88,500	2.15	23.5
Heat Recovery	Normal	WU-144MF1U9	Non-Ducted	137,000	10.9	17.1	151,000	3.31	83,500	2.25	23.8
Heat Recovery	Salt Protect	WU-144MF1U9E	Ducted	139,000	10.8	16.4	157,000	3.21	93,500	2.05	23.1
Heat Recovery	Salt Protect	WU-144MF1U9E	Mixed	138,000	10.9	16.8	154,000	3.26	88,500	2.15	23.5
Heat Recovery	Salt Protect	WU-144MF1U9E	Non-Ducted	137,000	10.9	17.1	151,000	3.31	83,500	2.25	23.8
Heat Recovery	Normal	WU-168MF1U9	Ducted	164,000	10.7	16.1	184,000	3.21	114,000	2.05	22.6
Heat Recovery	Normal	WU-168MF1U9	Mixed	162,000	10.6	16.5	181,000	3.21	106,000	2.05	23.0
Heat Recovery	Normal	WU-168MF1U9	Non-Ducted	160,000	10.5	16.9	178,500	3.21	98,000	2.05	23.3
Heat Recovery	Salt Protect	WU-168MF1U9E	Ducted	164,000	10.7	16.1	184,000	3.21	114,000	2.05	22.6
Heat Recovery	Salt Protect	WU-168MF1U9E	Mixed	162,000	10.6	16.5	181,000	3.21	106,000	2.05	23.0
Heat Recovery	Salt Protect	WU-168MF1U9E	Non-Ducted	160,000	10.5	16.9	178,500	3.21	98,000	2.05	23.3
Heat Recovery	Normal	WU-192MF1U9	Ducted	192,000	10.6	16	213,000	3.21	132,000	2.05	22.3
Heat Recovery	Normal	WU-192MF1U9	Mixed	189,000	10.6	16.4	209,500	3.21	123,000	2.05	22.6
Heat Recovery	Normal	WU-192MF1U9	Non-Ducted	186,000	10.5	16.7	206,000	3.21	114,000	2.05	22.8
Heat Recovery	Salt Protect	WU-192MF1U9E	Ducted	192,000	10.6	16	213,000	3.21	132,000	2.05	22.3
Heat Recovery	Salt Protect	WU-192MF1U9E	Mixed	189,000	10.6	16.4	209,500	3.21	123,000	2.05	22.6
Heat Recovery	Salt Protect	WU-192MF1U9E	Non-Ducted	186,000	10.5	16.7	206,000	3.21	114,000	2.05	22.8
Heat Recovery	Normal	WU-216MF1U9	Ducted	203,000	10.6	16	228,000	3.21	136,000	2.05	22.2
Heat Recovery	Normal	WU-216MF1U9	Mixed	200,500	10.6	16.3	224,500	3.21	128,000	2.05	22.6
Heat Recovery	Normal	WU-216MF1U9	Non-Ducted	198,000	10.5	16.6	221,000	3.21	120,000	2.05	22.9
Heat Recovery	Salt Protect	WU-216MF1U9E	Ducted	203,000	10.6	16	228,000	3.21	136,000	2.05	22.2
Heat Recovery	Salt Protect	WU-216MF1U9E	Mixed	200,500	10.6	16.3	224,500	3.21	128,000	2.05	22.6
Heat Recovery	Salt Protect	WU-216MF1U9E	Non-Ducted	198,000	10.5	16.6	221,000	3.21	120,000	2.05	22.9
Heat Recovery	Normal	WU-240MF1U9	Ducted	230,000	10.5	16	265,000	3.21	159,000	2.05	22.0
Heat Recovery	Normal	WU-240MF1U9	Mixed	225,500	10.5	16.2	255,500	3.21	147,500	2.05	22.2
Heat Recovery	Normal	WU-240MF1U9	Non-Ducted	221,000	10.5	16.4	246,000	3.21	136,000	2.05	22.4
Heat Recovery	Salt Protect	WU-240MF1U9E	Ducted	230,000	10.5	16	265,000	3.21	159,000	2.05	22.0
Heat Recovery	Salt Protect	WU-240MF1U9E	Mixed	225,500	10.5	16.2	255,500	3.21	147,500	2.05	22.2
Heat Recovery	Salt Protect	WU-240MF1U9E	Non-Ducted	221,000	10.5	16.4	246,000	3.21	136,000	2.05	22.4
Heat Recovery	Normal	WU-264MF1U9	Ducted	258,000	9.7	15.9	288,000	3.21	177,000	2.05	21.6
Heat Recovery	Normal	WU-264MF1U9	Mixed	255,000	9.6	16.1	278,500	3.21	163,500	2.05	21.8
Heat Recovery	Normal	WU-264MF1U9	Non-Ducted	252,000	9.4	16.3	269,000	3.21	150,000	2.05	22.0
Heat Recovery	Salt Protect	WU-264MF1U9E	Ducted	258,000	9.7	15.9	288,000	3.21	177,000	2.05	21.6
Heat Recovery	Salt Protect	WU-264MF1U9E	Mixed	255,000	9.6	16.1	278,500	3.21	163,500	2.05	21.8
Heat Recovery	Salt Protect	WU-264MF1U9E	Non-Ducted	252,000	9.4	16.3	269,000	3.21	150,000	2.05	22.0
Heat Recovery	Normal	WU-288MF1U9	Ducted	281,000	9.6	15.8	312,000	3.21	194,000	2.05	21.2
Heat Recovery	Normal	WU-288MF1U9	Mixed	278,000	9.5	16	302,500	3.21	179,500	2.05	21.4
Heat Recovery	Normal	WU-288MF1U9	Non-Ducted	275,000	9.4	16.2	293,000	3.21	165,000	2.05	21.6
Heat Recovery	Salt Protect	WU-288MF1U9E	Ducted	281,000	9.6	15.8	312,000	3.21	194,000	2.05	21.2
Heat Recovery	Salt Protect	WU-288MF1U9E	Mixed	278,000	9.5	16	302,500	3.21	179,500	2.05	21.4
Heat Recovery	Salt Protect	WU-288MF1U9E	Non-Ducted	275,000	9.4	16.2	293,000	3.21	165,000	2.05	21.6